Abstract

A wireless communication system transmits data on multiple carriers simultaneously to provide frequency diversity. Carrier interference causes a narrow pulse in the time domain when the relative phases of the multiple carriers are zero. Selection of the frequency separation and phases of the carriers controls the timing of the pulses. Both time division of the pulses and frequency division of the carriers achieves multiple access. Carrier interferometry is a basis from which other communication protocols can be derived. Frequency hopping and frequency shifting of the carriers does not change the pulse envelope if the relative frequency separation and phases between the carriers are preserved. Direct sequence CDMA signals are generated in the time domain by a predetermined selection of carrier amplitudes. Each pulse can be sampled in different phase spaces at different times. This enables communication in phase spaces that are not detectable by conventional receivers. The time-dependent phase relationship of the carriers provides automatic scanning of a beam pattern transmitted by an antenna array. In waveguide communications, the carrier frequencies and phase space may be matched to the chromatic dispersion of an optical fiber to increase the capacity of the fiber.